

## MELANOPHILA BEETLES AT CEMENT PLANTS IN SOUTHERN CALIFORNIA (Coleoptera, Buprestidae)

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Buprestid beetles of the genus *Melanophila* (*s. str.*) have been reported as attracted by burning trees and stumps, forest fires, oil fires, burning refuse dumps, distillation plants, sugar refineries, smelter plants, and cigarette smoke hanging over a football stadium (see reviews by Linsley, 1943 and Dethier, 1947). During this past summer near San Jose, California, one of us observed small numbers of *Melanophila occidentalis* Obenberger being attracted to an outdoor barbecue fire when large quantities of deer meat were being prepared.

In the summer of 1954 reports were received from H. J. Ryan, Agricultural Commissioner of Los Angeles County, California, that *Melanophila* were swarming about cement plants in southern California, where they are known as "stack bugs." However, it was not until late August, 1956, that it was possible to visit these plants and investigate the matter at first hand.<sup>2</sup> The results, although not definitive, add another small chapter to the accumulating knowledge of the remarkable reactions of these beetles.

Cement plants were visited at two localities — Crestmore, approximately 5 miles northwest of Riverside in Riverside County; and Oro Grande, 8 miles north of Victorville on the Mojave Desert in San Bernardino County.

In each locality two species of *Melanophila* were present, *M. consputa* LeConte, and *M. occidentalis* Obenberger; the first predominant at Oro Grande, the second at Crestmore. The former species has been reported as breeding in various pines, including *Pinus ponderosa*, *P. murrayana*, *P. radiata*, *P. torreyana*, *P. attenuata*, and *P. contorta* (Sloop, 1937; Barr and Linsley, 1947) as well as *Libocedrus decurrens* and *Eucalyptus globulus*, although the last two records have been questioned. *M. occidentalis*, however, appears to breed regularly in broad-leaved trees and shrubs, including oak, madrone and *Eucalyptus*.

Generally speaking the beetles congregate in the vicinity of the kilns.

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At Crestmore they were flying about a catwalk directly over the kilns near a conveyer which carried hot clinkers from the ovens to the clinker pile. The *Melanophila* were concentrated along a 20-foot stretch of walkway where the black globe thermometer registered 48.5°C. About half of the beetles seen were resting in the shade on the metal frames and railings of the catwalk; the others were running about over the metal in the sun. A robber fly, *Erax* sp., had captured one of the beetles and was feeding on it on a frame above the conveyor with the hot clinkers. One specimen of *M. consputa* and 7 specimens of *M. occidentalis* were represented in the small sample which was captured between 1:00 and 2:30 p.m. Pacific Standard Time. Although not all the beetles observed were captured, no other examples of *M. consputa* were seen.

At the Oro Grande Plant the beetles were far more abundant, and thousands must have been present. Our sample was taken between 1:30 and 3:00 p.m. Pacific Standard Time, and contained 117 examples of *M. consputa* and 35 of *M. occidentalis*. These were collected from a variety of stations about the plant, always in hot areas. They were especially numerous in the vicinity of the burning zone of the kiln where the air temperatures registered 50.6°C. on the black globe thermometer. They became less abundant as one walked away from the kiln and at a distance of 40 feet were quite scarce. At the opposite end of the kiln (350 feet long) the air temperatures registered 45.6°C. where the *Melanophila* were resting in the shade on the warm concrete surface of a 50 foot building; 56.7°C. where they were flying about in the sun. A large part of the sample was taken from our clothing and those of plant personnel. The beetles generally crawl upward and when they reach the neck have a tendency to bite or pinch with the mandibles. They are heartily disliked by the workmen in the plants.

Elsewhere in the plant beetles were found resting on walls with surface temperatures estimated to be between 43.3°C. and 48.9°C., or running rapidly about in the sun on surfaces which were much hotter. In one site large numbers were swarming about moist clinker dust where the black globe registered 51.1°C. In the vicinity of the clinker pile where the temperature of the newly added clinkers is nearly 426.67°C., *Melanophila* were flying about but at a distance of 6 to 10 feet from the surface of the pile.

As in other cases of attraction of *Melanophila*, all the indirect evidence points to flight from a distant area. At Crestmore there were several groves of Eucalyptus within a half mile of the plant and many of these were dead—some burned. However, although these had been heavily attacked by *Xylotrechus nauticus* Mannerheim (Cerambycidae), no bor-

ings of *Melanophila* were found. The nearest coniferous forests are about 20 air line miles away to the north. At Oro Grande the air distance from forested areas is even greater, 40 miles S.S.W. Nevertheless, it would appear that the dust given off by the stacks, and which can be seen to drift for miles, is the means of attracting the beetles to the plants. A large percentage of the beetles seen were covered with a very fine cement dust which they presumably encountered while flying through this dust.

The mode and probable evolutionary significance of this unusual habit have been discussed previously (Linsley 1943:342). It is concluded that under natural circumstances the initial attraction by smoke leads the beetles to forest fires where they normally oviposit in scorched wood and, further, that the beetles are stimulated by heat in the vicinity of the source since they fly rapidly and run about over hot surfaces.

#### LITERATURE CITED

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